In the claims:

1. (Previously Presented) A non-destructive *in situ* method for directly monitoring an electronic device, comprising the steps of:

measuring at least one outgas or volatile organic compound of a material, a byproduct of the material, a reaction product of a constituent of the material, or a contaminant of a material of the electronic device, by means of a multisensor array comprising at least one solid-state gas sensor;

detecting more than one property of the outgas or volatile organic compound to produce more than one signal;

combining the signals to produce a signal output which can be processed with a multivariate statistical algorithm; and

processing the signal output with multivariate analysis to convert the signal output into information representative of a quality of the material.

2. (Previously Presented) A method according to claim 1 wherein the multivariate analysis comprises processing the signal output with a pattern recognition algorithm.

3. (Original) A method according to claim 2 wherein the multivariate analysis uses unsupervised statistical pattern recognition.

4. (Original) A method according to claim 2 wherein the multivariate analysis uses supervised statistical pattern recognition.

5. (Original) A method according to claim 1 wherein the analysis is at least one member selected from the group consisting of classical least squares (CLS), inverse least squares (ILS), partial least squares (PLS), principal components analysis (PCA), principle components regression (PCR), nonlinear principle components regression (NLPCR), nonlinear partial least squares (NLPLS), deterministic finite-state automata (DFA), Fast Look-up Algorithm for String Homology (FLASH), pattern recognition, and neural networks.

6. (Previously Presented) A method according to claim 1 wherein the processing

step comprises sensory evaluation of the sample materials by human paneling to determine the quality of the material.

7. (Previously Presented) A method according to claim 1 wherein the step of measuring uses a near-field probe sensor which comprises a coated optical fiber.

8-9. (Cancelled)

10. (Previously Presented) A method according to claim 1 wherein at least one outgas or volatile organic compound is collected by a static or dynamic headspace technique in the measuring step.

11. (Previously Presented) A method according to claim 10, wherein heat, electromagnetic radiation, electricity, magnetism, or mechanical vibration assists in transferring the at least one outgas or volatile organic compound from the material.

12. (Previously Presented) A method according to claim 1 wherein at least one member of the group consisting of a semiconductor gas sensing device, a conductive polymer gas sensing device, a surface acoustic wave gas sensing device, a microbar sensing device, a micromechanical probe, a quartz crystal microbalance, and an optical sensor is used in the detecting step.

13. (Previously Presented) A method according to claim 1 wherein at least a metal oxide semiconductor gas sensing device is used in the detecting step.

14. (Cancelled)

15. (Previously Presented) A method according to claim 1, wherein the electronic device comprises a circuit board or a multichip module.

16. (Previously Presented) A method according to claim 1, wherein the outgas or volatile organic compound is at least one member of the group consisting of anions, organic acids, organics, and particulates.

17. (Cancelled)

18. (Original) A method according to claim 15 wherein the circuit board is in a soldering operation

19. (Original) A method according to claim 15 wherein the circuit board uses surface mount technology.

20-43. (Cancelled)

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